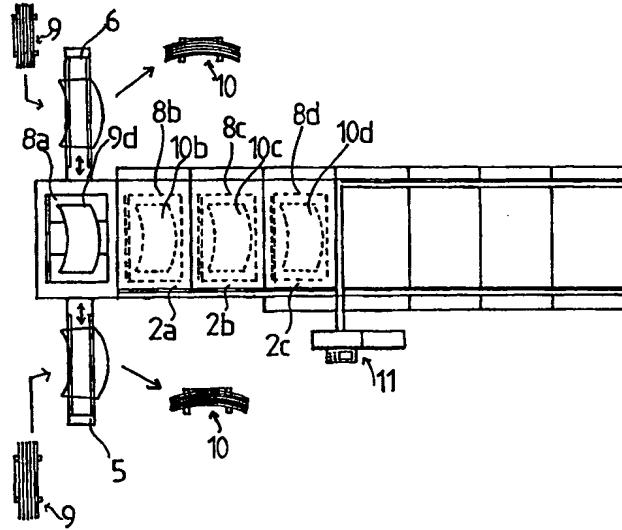


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : C03B 23/025	A1	(11) International Publication Number: WO 00/29339 (43) International Publication Date: 25 May 2000 (25.05.00)
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(71) Applicant (<i>for all designated States except US</i>): GLASS-ROBOTS OY [FI/FI]; Hepolamminkatu 32, FIN-33720 Tampere (FI).		Published <i>With international search report. In English translation (filed in Finnish).</i>
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(74) Agent: NIEMINEN, Taisto; Patentitoimisto T Nieminen Oy, Kehäsaari B, FIN-33200 Tampere (FI).		

(54) Title: ARRANGEMENT IN A GLASS BENDING OVEN



(57) Abstract

An arrangement in the unloading and loading end of a multisection glass bending furnace, especially in such a furnace of, where the glass sheets (9, 10) travel along a special rail from one furnace section to the next section in mould carriages (8) moving in cycles on the said rail. For loading and unloading the mould with the bent glass (10) resting on it is shifted in carriage (8) from the rail over to the first side station and from the second side station the mould including glass sheet (9) is shifted over into the said carriage, while the carriage keeps moving forward on the rail. In both side stations the bent glass sheet is removed from the mould and a new glass sheet (9) mounted into the mould. A mould transmitter in each side station collects the moulds from one and the same section and returns the moulds to the same furnace section.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 98/00881

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: C03B 23/025

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0592862 A1 (TAMGLASS ENGINEERING OY), 20 April 1994 (20.04.94), page 2, line 1 - line 6, figures 2,3, claims 1,7,13,15,19 --	1-3
X	EP 0132701 A2 (O/Y KYRO A/B TAMGLASS), 13 February 1985 (13.02.85), page 1, line 4 - line 23; page 3, line 28 - line 30; page 6, line 16 - line 22, page 7, line 3 - line 10; figure 3; claims 1,4; abstract --	1-3
X	EP 0736498 A2 (TAMGLASS ENGINEERING OY), 9 October 1996 (09.10.96), column 1, line 3 - line 13; column 2, line 1 - line 21, figure 1, claim 1, abstract --	1-3

Further documents are listed in the continuation of Box C.

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Date of the actual completion of the international search

11 June 1999

Date of mailing of the international search report

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PCT/FI 98/00881

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0568053 A1 (TAMGLASS ENGINEERING OY), 3 November 1993 (03.11.93), column 1, line 1 - line 6; column 2, line 8 - line 10; column 3, line 1 - line 7, figure 1, claim 1, abstract --	1-3
X	Patent Abstracts of Japan, No 6 abstract of JP 57-140325 A (ASAHI GLASS KK), 30 August 1982 (30.08.82) --	1-3
A	US 5071461 A (TAKASHI HIROTSU ET AL), 10 December 1991 (10.12.91), column 1, line 6 - line 67, figures 1,10,14, claims 1,13,14 -- -----	1-7

INTERNATIONAL SEARCH REPORT

Information on patent family members

03/05/99

International application No.

PCT/FI 98/00881

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0592862 A1	20/04/94	AT 149978 T AU 666043 B AU 4879593 A CA 2107841 A CN 1088550 A DE 69308715 D, T FI 91521 B, C FI 924666 D JP 7300328 A US 5437704 A US 5472469 A FI 94233 B, C FI 94234 B, C FI 94235 B, C FI 932861 A FI 933318 A FI 935664 A	15/03/97 25/01/96 28/04/94 16/04/94 29/06/94 19/06/97 31/03/94 00/00/00 14/11/95 01/08/95 05/12/95 28/04/95 28/04/95 28/04/95 22/12/94 22/12/94 22/12/94
EP 0132701 A2	13/02/85	SE 0132701 T3 AT 38025 T CA 1203381 A DE 3474656 A FI 68390 B, C FI 832684 A JP 1912448 C JP 60051624 A US 4497645 A	15/11/88 22/04/86 24/11/88 31/05/85 26/01/85 09/03/95 23/03/85 05/02/85
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US 5071461 A	10/12/91	DE 68919931 D, T EP 0351739 A, B JP 2007595 C JP 2030632 A JP 7029793 B JP 2038331 A	01/06/95 24/01/90 11/01/96 01/02/90 05/04/95 07/02/90

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REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

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PCT/FI 98/00881

International Application No.

International Filing Date

12 NOV 1998 (12.11.98)

The Finnish Patent Office
PCT International Application

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum)

PCT-118

Box No. I TITLE OF INVENTION

ARRANGEMENT IN A GLASS BENDING OVEN

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

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This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:

FI

State (that is, country) of residence:

FI

This person is applicant for the purposes of:

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FIN-36220 KANGASALA, FINLAND

This person is:

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applicant and inventor

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Box No. VI PRIORITY CLAIM

 Further priority claims are indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
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Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets:

request	:	3
description (excluding sequence listing part)	:	4
claims	:	2
abstract	:	1
drawings	:	1
sequence listing part of description	:	_____
Total number of sheets	:	11

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Figure of the drawings which should accompany the abstract: 2

Language of filing of the international application: Finnish

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Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).



Taisto Nieminen

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12 NOV 1998

(12-11-1998)

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(07.12.98)

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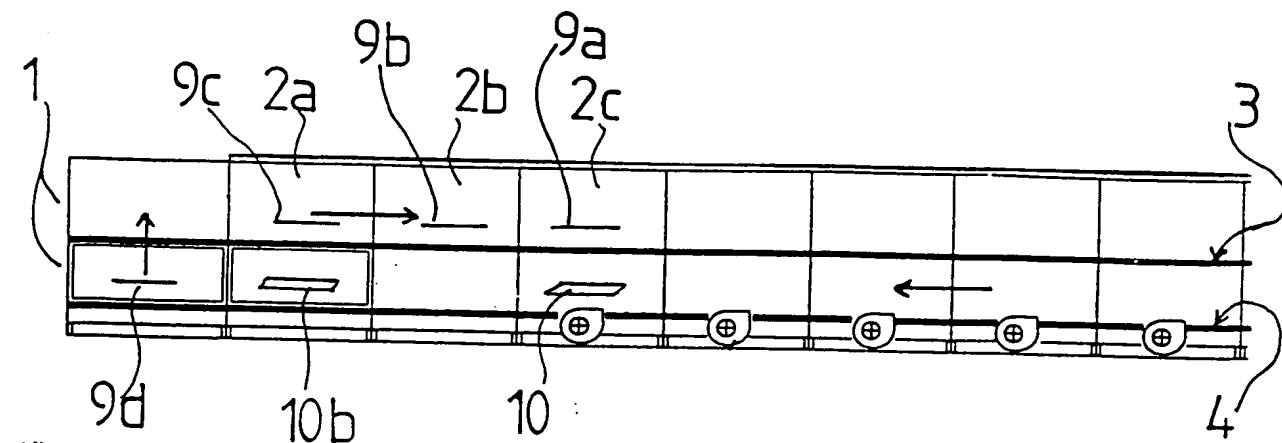


Fig.1

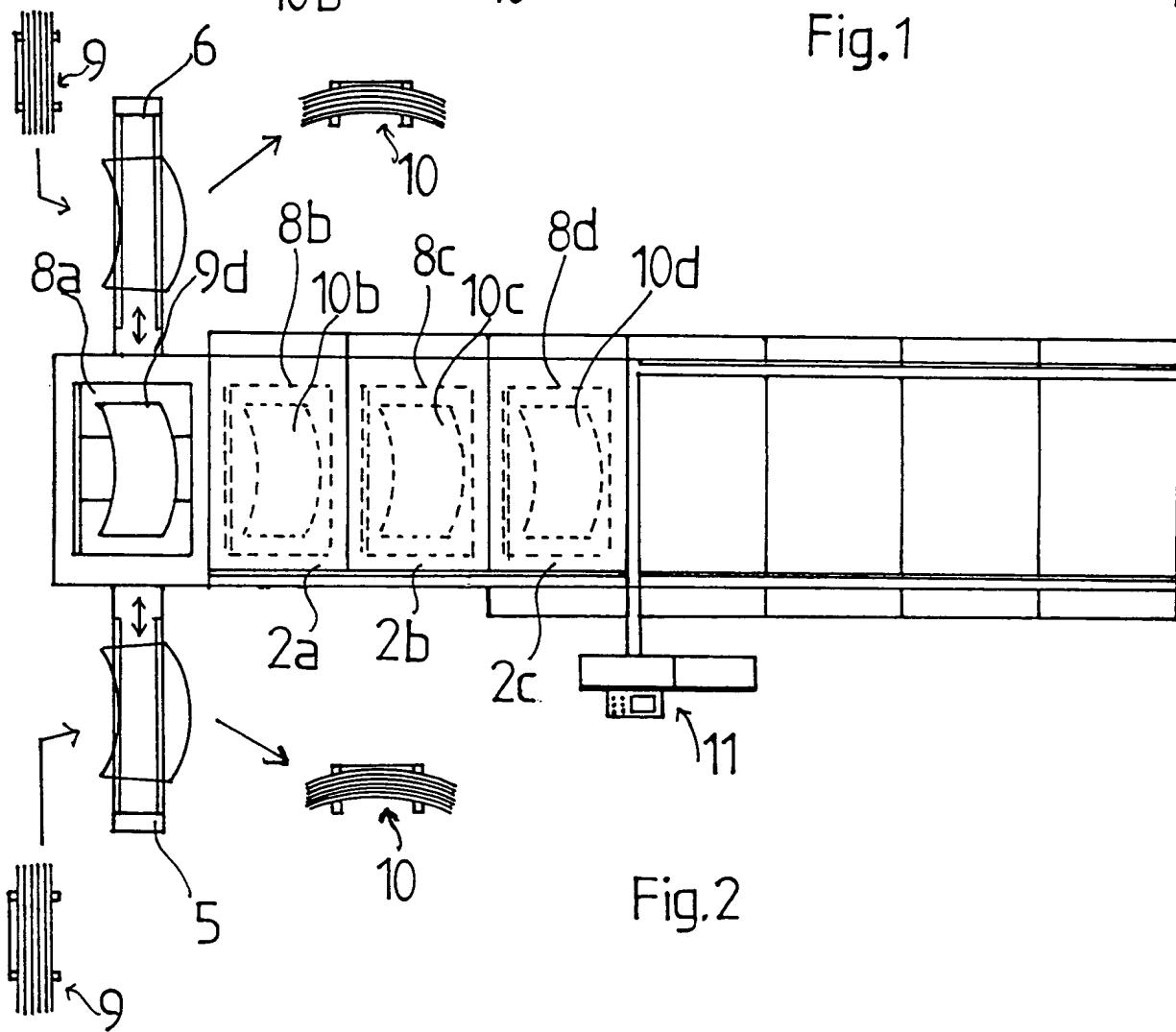


Fig.2

JÄRJESTELY LASINTAIVUTUSUUNISSA

Keksintö kohdistuu patenttivaatimuksen 1 johdanto-osan mukaiseen järjestelyyn lasintaivutusuunissa, jolla vältetään lasin poistamis- ja lastausaikojen muodostuminen kapasiteettia rajoittavaksi tekijäksi.

Ennestään tunnettuja ovat ns. sarjauunityyppiset taivutusunit, joissa taivutukseen menevät lasit liikkuvat yläradalla taivutukseen ja taivutetut takaisin alarataa pitkin purkaus- ja lastauskohtaan joko sivuseinällisissä tai avonaisissa vaunuissa. Näissä ratkaisuissa täytyy suorittaa sekä taivutetun lasin poisto että suoran aihion asetus muotille sen ajan kuluessa, minkä ko. vaunu on paikallaan ns. lastaushissin alaosassa.

Vaunujen liikkeiden kiertoaika sis. vaakaliikkeet, hissien liikkeet, sivupalkkien toiminta yms. kestää tyypillisesti noin 30 s. Tällöin vaunu on paikallaan em. lastaushissin alaosassa kulloisestakin uunin kapasiteetista riippuvasti. Esim. kapasiteetilla n kpl/h on paikallaanoloaika $(3600 \text{ s})/n - 30\text{s}$.

Jos uunilta vaaditaan kapasiteetti esim. 60 kpl/h jää tällöin purkaus- ja lastausaikaa yhteensä 30 s ($= 15 \text{ s} + 15 \text{ s}$). Lastaus ja purkaminen onnistuvat vielä tässä tapauksessa tottu-neiltä henkilöiltä, kuitenkin tarvittaisiin kaksi henkilöä.

Mutta jos kapasiteettia halutaan nostaa esim. arvoon 100 kpl/h on ns. jaksoaika 36 s ja lastaus- ja purkausaikaa jää yhteensä 36 s - 30 s = 6 s, jolloin tehtävä on mahdoton.

Keksinnön mukainen järjestely poistaa purku- ja lastaustoimintojen aiheuttaman kapasiteetin nostorajoituksen. Keksinnölle on tunnusmerkillistä se, mitä on esitetty patenttivaatimuksissa.

Järjestelyn avulla ei olla sidottuna jakson pituuteen niin, että muottivaunuun kohdistuva purku- ja lastaustyö olisi saatava suoritetuksi jakson aikana. Järjestelyn johdosta uunin

kapasiteettia voidaan ollenaisesti nostaa nykysissä sarjauu-
neissa tunnetuista arvoista noin 30 - 70 kpl tunnissa arvoon
100 - 120 kpl tunnissa. Järjestelyn avulla sekä taivutetut
lasit että uuniin lastattavat suorat lasit ovat nykyistä hel-
pommin käsittelyissä, sillä muotit ovat paremmin vedettynä
esille lasinvaihtotyön ajaksi järjestelyyn kuuluvassa erikoi-
sesti lasinvaihtoon tarkoitettussa asemassa.

Seuraavassa keksintöä selitetään lähemmin viittaamalla ohei-
seen piirustukseen, jossa

Kuvio 1 esittää erästä uuniratkaisua kaaviollisesti esitetty-
nä sivulta.

Kuvio 2 esittää kaaviollisesti uuniratkaisua päältä ja keksin-
nön mukaista järjestelyä siihen liitettyä.

Kuviossa 1 on sivulta nähtynä sarjauuni, jossa on ylärata 3
ja alarata 4. Taivutettava lasi 9 kulkee yläradalla muottivau-
nussa 8 osastolta 2a toiselle 2b, 2c jne. Yläradalla lasi läm-
mitetään taivutuslämpötilaan. Alaradalla taipuneet lasit 10
tulevat muottivaunussa 8 jäähytysosastojen kautta kohti pur-
kaus- ja lastauspääätä, jossa on myös hissiosasto 1. Päälek-
käisiä muita osastoja on merkitty lohkonumerolla 2a, 2b, 2c
jne. Prosessiin kuuluvan jakson aikana kukin muottivaunu 8
pysähtyy ao. osastoon. Jaksoon kuuluu yksi vaunun siirtoaika
ja yksi vaunun pysähdyssaika.

Kuviossa 2 on uuni kuvattu päältä. Alaradalla 4 tulee taivu-
tetut lasit 10 muottivaunuissa 8 vuorotellen osastoon 2a. Ku-
vion 2 tapauksessa osastosta 2a alaradalta muotti ja siinä
oleva taipunut lasi 10b siirretään hissiosastoon 1, kun hissi
on ensin nostanut vaunun 8a ja siinä olevassa muotissa olevan
suoran lasin 9d yläradalle 3. Kun lasi 10b ja muottivaunu 8b
ovat hissiosaston alaradalla noutaa vuorossa oleva siirtolaitte
esim. laite 5, lasin 10b ja muotin vetämällä ne sivuasemaan
siirtolaitteen 5 varaan. Taipunut lasi 10b poistetaan pinoon
10. Suora lasi pinosta 9 asennetaan muottiin tilalle.

Sillä aikaa toinen siirtokuljetin 6 tuo muotin ja uuden lasin
9e muottivaunuun 8b. Hissi nostaa vaunun 8b ylös ja järjestely
on valmis ottamaan vastaan ja siirtämään seuraavan muottivaunun
8c osastolle 1 riippumatta siitä onko radalla siirtojakso

käynnissä vai ei. Viimeksi lasin tuonut siirtokuljetin 6 ottaa ensimmäiseksi osastolle 1 tulleesta seuraavasta vaunusta 8c muotin ja lasin 10c ja vetää sivuun lasin vaihtoa varten.

Muottivaunu 8c on nyt tyhjä osastossa 1 ja siirtokuljetin 5 siirtää siihen muotin ja uuden lasin 9f. Hissin nostettua vaunun 8c ylös, siirretään muottivaunu 8d, joka on tullut jo vähintään osastoon 2b siirtojakson aikana, osastoon 1 ja siirtokuljetin 5 noutaa muotin ja lasin 10d. Se siirtokuljetin, joka viimeksi toi muotin ja suoran lasin osastoon 1, ottaa myös seuraavaksi osastoon tulleen taipuneen lasin siirrettäväksi vastaavalle sivuasemalle. Tällä järjestelyllä siirtokuljettimet voivat pitää vuorollaan kutakin muottia sivussa pidemmän ajan lasinvaihtoa varten.

Kuviossa 1 on osasto 2b kuvatulla hetkellä tyhjä alaradalla. Keksinnön eräs edullinen sovellutusmuoto on, että osastosta 2c muottivaunu lähtee eteenpäin vielä siirtojakson ohjaamana ts. muiden vaunujen työntämänä, mutta osastolle 2a ja 2b tai ainakin osastolle 2a saapunut vaunu ohjataan eteenpäin siirtojakosta riippumatta. Nämä vaunut siirretään järjestyksessä hissiosastoon 1 olennaisesti heti kun hissiosasto on tyhjä. Kun järjestelyssä ainakin yksi osasto 2a tai 2b alaradalla on tarkoituksellisesti tyhjä, voi siirtojakson ohjaamana seuraava muottivaunu esim. 8d tulla vapaasti tyhjään osastoon aiheuttamatta mitään pakkosiirtoa hissiosastoon keksinnön mukaisessa järjestelyssä.

Keksinnön mukaisessa järjestelyssä on muotteja yksi enemmän kuin muottivaunuja 8. Ylimääräinen muotti (kukin muotti vuorollaan) on sivuasemalla, jolloin purkaus- ja lastaustilanne aiheuttaa sen, että sivuasemalta palautettava muotti ei pääse takaisin samaan vaunuun, josta se asemalle noudettiin. Ylimääräisen muotin ansiosta lisääntyy käytettävissä oleva purkaus- ja lastausaika merkittävästi. Jos muotteja on parillinen määrä, palautuu lasi taivutettuna samalle puolelle uunia mistä se vietin uuniin. Tämä on sekatuotannossa tärkeätä tavaran säilytyksen ja järjestyksen kannalta.

Seuraavassa esimerkki uunista, jonka kapasiteetti on nostettu

keksinnön mukaisella järjestelyllä arvoon 100 kpl tunnissa.

Jakson pituus on	3600 s/100 kpl = 36 s/kpl
Lastaushissi ylös, ajan käyttö	4,5 s
vaunu lastaushissiin	4,5 s
lasin nouto	10 s
lasin vienti sisään	<u>10 s</u>
	Yht. n. 29 - 30 s

Lasin vaihtoaika on $2 \times$ jakson pituus - ylläolevat siirtoajat eli $72 \text{ s} - 30 \text{ s} = 42 \text{ s}$

Kummankin puolen sivuasemalla jää 42 s aikaa vaihtaa lasi paikallaan olevaan muottiin. Aika on siis jopa pitempi kuin on jakson pituus.

On huomattava että, muottivaunujen 8 siirtoon osastolta toiselle tarvittavaa siirtoaikaa ei tarvitse ottaa huomioon.

Siirtokuljettimet 5 ja 6 ovat sopivimmin haarukkavaunuja, joiden haarukat nostavat muotin ja siirtävät sivuasemaan. Keksintöön kuuluvat sivuasemat tuovat mukanaan merkittävän kapasiteetin kasvun. Uunirakenteeseen kuuluu ohjauskeskus 11, jolla ohjataan uunin toimintaa. Mm. siirtokuljettimien 5 ja 6 toimintojen ajoituksen ohjaus voidaan tehdä automaattiseksi ja yhteistoimintaan muottivaunujen siirron kanssa osastosta 2a osastoon 1.

PATENTTIVAATIMUKSET

1. Järjestely useampiosastoisen lasintaivutusuunin purkaus- ja lastauspäässä etenkin sellaisessa uunissa, jossa lasilevyt (9), (10) kulkevat erityistä rataa (3), (4) pitkin uunin osastolta seuraavalle osastolle sijoitettuna mainitulla radalla jaksottain eteneviin muottivaunuihin (8) mainitun radan ollessa järjestetty kiertämään taivutusosaston kautta ja palamaan takaisin lastaus- ja purkauspäähän, tunnettu siitä, että

- lasien purkaus- ja lastaustoimintaa varten siirretään vau- nussa (8) oleva muotti ja muotin varassa oleva taipunut lasi (10) radalta (4) ensimmäiselle sivuasemalle ja toiselta sivu- asemalta siirretään muotti ja siinä oleva lasi (9) mainittuun vaunuun vaunun jatkaessa radalla (4) eteenpäin,

- kummallakin sivuasemalla poistetaan taipunut lasi (10) muo- tista ja uusi lasi (9) asennetaan muottiin ja että

- kumpaankin sivuasemaan kuuluva muotinsiirtolaite (5), (6) noutaa muotit yhdestä ja samasta lastaukseen tarkoitettusta osastosta (1) ja palauttaa muotit mainittuun samaan osastoon.

2. Patenttivaatimuksen 1 mukainen järjestely tunnettu siitä, että muottien lukumäärä on suurempi kuin muottivaunujen (8) lukumäärä.

3. Patenttivaatimusten 1 ja 2 mukainen järjestely tun- nettu siitä, että siirtolaitteilla noudetaan muotit ala- radan (4) hissiosastosta (1) ja palautetaan sinne.

4. Jonkin edellisen patenttivaatimuksen 1 - 3 mukainen järjes- tely tunnettu siitä, että ensimmäinen ja toinen sivuasema sijaitsevat eripuolilla hissiosastoa (1).

5. Jonkin edellisen patenttivaatimuksen 1 - 4 mukainen jär- jestely tunnettu siitä, että alaradan (4) hissiosas- tolle (1) johdetaan edellisestä osastosta (2a) muottivaunu (8) erillisen ohjauksen avulla riippumatta muiden vaunujen siirtojaksosta.

6. Jonkin edellisen patenttivaatimuksen 1 - 4 mukainen jär- jestely tunnettu siitä, että alaradan (4) hissiosas-

tolle (1) johdetaan edellisestä (2a) ja sitä edellisestä (2b) osastosta muottivaunut (8) erillisen ohjauksen avulla riippumatta muiden vaunujen siirtojaksosta.

7. Jonkin edellisen patenttivaatimuksen 1 - 6 mukainen järjestely tunnettu siitä, että kukin muotti on vuorolaaan siirrettynä pois uunissa olevalta radalta (4) olennairesti kauemmin kuin on mainitun radan yhden jakson kestoaika.

(57) Tiivistelmä

7

Järjestely useampiosastoisen lasintaivutus-
uunin purkaus- ja lastauspäässä etenkin sel-
laisessa uunissa, jossa lasilevyt (9), (10)
kulkevat erityistä rataa pitkin uunin osas-
tolta seuraavalle osastolle sijoitettuna mai-
nitulla radalla jaksottain eteneviin muotti-
vaunuihin (8). Lasien purkaus- ja lastaustoi-
mintaa varten siirretään vaunussa oleva muot-
ti ja muotin varassa oleva taipunut lasi ra-
dalta ensimmäiselle sivuasemalle ja toiselta
sivuasemalta siirretään muotti ja siinä oleva
lasi mainittuun vaunuun vaunun jatkaessa ra-
dalla eteenpäin. Kummallakin sivuasemalla
poistetaan taipunut lasi muotista ja uusi lasi
asennetaan muottiin. Kumpaankin sivuasemaan
kuuluva muotinsiirtolaite (5),(6) noutaa muo-
tit yhdestä ja samasta uuniosastosta ja pala-
uttaa muotit mainittuun samaan uuniosastoon.

FIG. 2

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

3

REC'D	02 MAR 2001
WIPO	PCT

Applicant's or agent's file reference PCT-118	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/FI98/00881	International filing date (day/month/year) 12.11.1998	Priority date (day/month/year)
International Patent Classification (IPC) or national classification and IPC7 C 03 B 23/025		
Applicant GLASSROBOTS OY et al		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>2</u> sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application
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Date of submission of the demand 09.06.2000	Date of completion of this report 12.02.2001
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer Mattias Arvidsson/ELY Telephone No. 08-782 25 00

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/FI98/00881

I. Basis of the report

1. With regard to the elements of the international application:*

 the international application as originally filed the description:

pages 1-5, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

 the claims:

pages _____, as originally filed

pages _____, as amended (together with any statement) under article 19

pages _____, filed with the demand

pages 6-7, filed with the letter of 04.12.2000

 the drawings:

pages 1, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

 the sequence listing part of the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is:

 the language of a translation furnished for the purposes of international search (under Rule 23.1(b)). the language of publication of the international application (under Rule 48.3(b)). the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

 contained in the international application in written form. filed together with the international application in computer readable form. furnished subsequently to this Authority in written form. furnished subsequently to this Authority in computer readable form. The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished. The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4. The amendments have resulted in the cancellation of: the description, pages _____ the claims, Nos. _____ the drawings, sheet/fig _____5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/FI98/00881

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-6	YES
	Claims	_____	NO
Inventive step (IS)	Claims	1-6	YES
	Claims	_____	NO
Industrial applicability (IA)	Claims	1-6	YES
	Claims	_____	NO

2. Citations and explanations (Rule 70.7)

The claimed invention relates to an arrangement in the unloading and loading end of a multi-section glass-bending furnace, where the glass sheets travel along a special rail from one furnace section to the next section in mould carriages moving on said rail. The rail is arranged to circulate through the bending section, and to return to the loading and unloading end.

The following documents are cited in the International Search Report as documents of particular relevance:

D1: EP 0592862 A1
 D2: EP 0132701 A2
 D3: EP 0736498 A2
 D4: EP 0568053 A1
 D5: JP 57140325 Patent Abstract of Japan

Cited document D1 relates to a method for bending glass sheets at least partially by gravity while supported on ring mould.

Cited document D2 relates to a furnace assembly for gravity bending glass sheets, transporting sheets on moulds through furnace on upper run and discharging along lower run.

Cited document D3 relates to a method for transferring mould-carrying wagons in a bending furnace for glass sheets and bending furnace.

Cited document D4 relates to a method and apparatus for bending and tempering a glass sheet.

Cited document D5 relates to an apparatus for manufacture a windshield for a car with superior strength by heating and bending a glass plate, and rapidly cooling the bent plate.

.../...

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/FI98/00881

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: V.

Claims 1-6:

None of the cited documents disclose an unloading and loading end of a multisection glass-bending furnace, with a first and a second side station, characterised in that the first and the second side station are located on different sides of the lift section.

With the side stations as arranged in the application, there is a remarkable increase of available loading and unloading time, compared to previously known technique.

Thus the invention according to claims 1-6 is novel, is considered to involve an inventive step and to have industrial applicability.

U.S. APPL. NO. 09/831705

INTERNATIONAL APPL. E198/00881

APPLICATION FILED BY: 20 months or 30 months

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INTERNATIONAL APPLICATION PAPERS IN THE APPLICATION FILE:

International application (RECORD COPY)
DOUBLE SIDED INTERNATIONAL APPLICATION
Article 19 amendments
PRIORITY DOCUMENT(S) NO.
 REQUEST FORM PCT/RO/101
PCT/IB/302
PCT/IB/306
PCT/IB/308
PCT/IB/331
 OTHER: PCT/IB/
 PCT/IPEA/409 IPER (PCT/IPEA/416)

409 ANNEXES to IPER
 PCT/ISA/210 (SEARCH REPORT)
Search Report References
Other papers filed
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Translation of International Application
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 Description
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Foreign Language in drawing
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 Amendments inserted into application
 Article 34 amendments
 Amendments inserted into application
DNA disk

Preliminary amendment(s) filed 14 MAY 01
Second submission
 Information Disclosure Statement
Second submission
 Assignment document
forward to Assignment branch
 Substitute Specification
 Small Entity Statement
 Type
 Oath/Declaration
Has the Oath/Declaration been executed
 Power of Attorney/Change of address

DATE:

35 U.S.C. 371 - Receipt of Request (PTO - 1309 Transmittal letter)

14 MAY 01

Date acceptable oath/declaration received

Date complete 35 U.S.C. 371 requirements met

102 (e) Date

DO/EO 903 Date of completion of Notification of Acceptance

08 JUN 01

DO/EO 905 Date of completion of Notification of Missing Requirements

DO/EO 917 Date of completion of Notification of A Defective Oath or Declaration

DO/EO 916 date of completion of Notification of Defective Response

DO/EO 913 Date of Notice of Defective Translation

DO/EO 909 Date of Notification of Abandonment